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A PLEA FOR SYMPOSIUM WORK.

PONDLIFE AND NEW METHODS OF NARCOTIZING POLYZOA ROTIFERA.

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In view of a tendency in this Society to have its volumes fill up a gap in scientific study, it was thought the subject of "Plankton" and its results might furnish a good field for research, at the same time providing a special corner which can fill out a want both from microscopic, biologic and economic reasons.

In an age of books it is strange that the Rambler beside ponds and ditches should have been left without a pocket companion until the little manual by the late M. C. Cooke appeared in the series entitled "Natural History Rambles" called "Ponds and Ditches," and the one by C. O. Groom Napier on "Lakes and Rivers" popularized the subject so much loved by the late H. Stack in his "Marvels of Pondlife." As a suggestion I would ask the consideration of forming a group or groups along some line of research and endeavor to work in one or other line of study, viz.: "Pondlife," to include (a) fauna; (b) methods of collecting; (c) preserving and mounting; (d) staining or the value and use of reagents; (e) results of studies in varieties and their morphology, etc.

This subject can be used to exchange material with those engaged in other lines of work; so that members can have material named by those who know what the organisms are and to use them to identify other forms and to familiarize themselves with an unknown subject, for the general complaint is "I do not know protozoa when I see them and so pass them by." Unfortunately, our workers are scattered and many members wish for help in their rambles, and we cannot do better than make a record in our Transactions by the successful "fielders" to notify of good places to study and gather material in the vicinity of our cities. When members go to Atlantic City, New York, Boston, etc., who is there who would not be glad to hear of a good nearby collecting spot that can be studied with ordinary apparatus, and so obtain material, fresh and preserved, of marine forms unknown to those of us living in the middle west. Some of us who visit California, Catalina and Puget Sound might be glad to know of localities, material and those willing to assist the visitors when there, and exchanges could be had and study work provided for winter months and rainy days.

It is a great disappointment to find after one has left Florida, New Orleans, or some other point, of the fine hunting naturalists' paradise we have passed by because we did not know of it. Some may say if we publish a locality where some fine colonies of fredericilli are to be found, we shall have the pond spoiled. It is hoped no member of our society is so deficient in humane collecting and a true scientific spirit as to wantonly destroy or take more than is reasonable for study and an exchange.

The difficulty still remains unsolved as to the best manner of preserving specimens of desmids, and such like small algæ, for future reference. The same is true of rotifers, though Mr. Rousset's formula with cocain or eucain has been a valuable help. Polyzoa and many of the other varieties all need special methods to preserve them in a natural way. Some forms kill and expand easily under a $\frac{1}{2}$ per cent. solution, where again nothing but a 10 per cent. will affect another species. A society like this can do a valuable amount of work in just this experimental study. Some of us who are expert technicians can mount in deep cells with some ringed cement known to be permanent if used for formal, cocain or chloretone solutions. Let them give us their ideas, for exchange is no robbery and only fair, unless a patent is held for his process.

To those interested in this line of work it will be of interest to take up the group of chemicals known as anodynes, among which we have cocain, eucain, beta-cain, stovain, kélene, chloretone, hydroxyline, phenol, camphor, thymol, etc. Various combinations of these give excellent results for special things. There is no excuse for lack of material, for many forms can be obtained in January, even under the ice and all the year round. Preparations to show the urticating bodies or thread cells have so far been unsuccessful.

Who has ever made serial sections of some of the polyzoa and studied their anatomic details? Some papers on the preparation of hydroids, mostly marine forms, by Mr. Harris of London, and published in the *Annals of Microscopy*, will be worthy of noting by any one interested in methods of killing these beautiful animals.

A method recently brought to my notice, through the kindness of Mr. H. E. Hurrell of England and communicated to him by Mr. Bradley of Adelaide for narcotizing, has certainly yielded most excellent results. The animals, say plumatella or other polyzoa, if in 2-6 ounces of pond water, are carefully washed in several changes of fresh spring or tap water by very gentle shaking in a suitable vessel. Care must be taken not to detach them from the plant if it can possibly be avoided. At any rate, care has to be exercised that they are not broken up by too vigorous action (reversing the tubes

or bottle should be sufficient if done several times). Now allow the polyzoa to stand in pure tap water or twice filtered river water until they have recovered from shock and extended freely. I use wide tubes of about 4 or 5 inches in length with not too many animals in each tube so as to give one a perfect view of the progress toward narcotization. Next have a special lot of stovain or eucain at hand and take up *one* drop only of the drug (15 grains dissolved in 100 c.c. of water), but before applying it fill up the pipette with fresh water so that it may dilute the dose. Then, with all care not to disturb the protozoons, squirt the mixture down the side of the tube in which they are, continuing the pipetting some 6 or 8 times so as to ensure that the agent thoroughly combines with the water. Repeat the one-drop dose at intervals of 10 minutes for 3 or 4 times, then go on with 2 drops for every 5 minutes, for a quarter of an hour; then proceed with about 4 drops if by this time the animals be not too sleepy. Great care and absolute attention is required at a certain psychologic moment, viz.: when there is the slightest tendency for the tentacles to curl over outward. At this moment one of the animals should be touched carefully with the pipette, and if it remains without finching the process is nearly complete. It should then be given a dose of about 6 drops and allowed to stand for a short time, and if you have a sufficient material a colony should be placed by itself in a small watchglass with a sufficient quantity of the narcotized water; then a pipette full of formalin (10 per cent. of the 40 per cent. commercial formalin) discharged over it, and if sufficiently narcotized this will remain extended and be killed and fixed at the same time. (N. B. The pipettes must on no account be mixed or used for any but the one reagent and it is well to color or mark them so no confusion can be made.) The stovain is used in the same strength that the eucain is for the narcotizing of the polyzoa, rotifera and entomostraca (Hurrell).

Chloretone is a most excellent solution, used in 1-5-10 per cent. strength solutions and is worthy of a trial.

If desired for class study, the animals can be rendered insensible and thoroughly examined, and when done with add more fresh water and they recover and seem no worse for their treatment. As noted by Prof. A. H. Cole of Chicago, it makes an excellent method for projecting animals on the screen when all can study their anatomy and many peculiarities. It affords both study and a pleasant subject for a lecture.

Those of the members who frequent the inland lakes of Wisconsin, Michigan, Indiana, Montana, Minnesota, New York and

Florida remember to collect a few vials for others interested and exchange for insects, diatoms, etc., and receive the gratitude of your less fortunate members. Remember the rotifera are prolific in bog-mosses or turf-mosses, as the Germans call them. The biologist confesses to the presence of infusoria within the cells of the leaves, but who can enumerate the creatures which sport outside, the water-fleas, wheel bearers and small snails; the confervoid algæ?

The sphagna suck up the atmospheric moisture and convey it to the earth. So they also contribute to it by pumping up to the surface of the tuft formed by them the standing water which was their cradle, diminish it by promoting evaporation, and later become material for fuel.

As a favorite locality for stephanoceros note the foliage of the water milfoil (*myriophyllum*) and on the slender roots of the willows which run into the water. *Floscularia ornata* or *cornuta* is met in the leaves of submerged plants as the water crowfoot. Take some of the slender-leaved water plants and examine a few branches at a time in a vial with a pocket lens. A small square vial is best made with two pieces of glass separated by three small pieces carefully joined together with marine glue or Ward's brown cement or the gelatin bichromate insoluble cement. It should be wide enough to easily admit the stems of water plants, so as not to squeeze them in putting them in. Two or three of these will be a great help, as one can stand quietly and allow the animal to recover from shock.

The first glimpse reveals an egg-shaped object of a brownish tint, stretching itself upon a stalk, and many show signs of hairs or cilia at its head. Now carefully manage the light obliquely, and the dirty brown hue disappears and is replaced by brilliant colors; the cilia become very long and resemble spun glass.

In regard to carrying collections of animals in bottles with water, much difference of opinion exists as to whether the jars should have an air vacuum left or not. Davis' Practical Microscopy, p. 134, says: "Do not have any portion of the bottle or tube filled with air if they are to be exposed to shaking or concussion." Dr. A. C. Stokes fills his bottles. I find a good way is to have a quill passed through each cork and cut off close at the outside, and this will prevent the water coming out and admit air at the same time.

If this method is of any use we should be glad to hear from others who might give their experiences in the forms of symposiums and a good discussion.